A study on the Metal Organic Chemical Vapor Deposition of Pure Copper Films from Low Cost Copper(II) Dialkylamino-2-propoxides: Tuning the Thermal Properties of the Precursor by Small Variations of the Ligand.

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Abstract

Pure copper metal thin films were grown on SiO_2/Si(100) substrates by metal-organic chemical vapor deposition (MOCVD) in a horizontal cold wall CVD reactor employing the two different metal organic compounds $Cu(OCHMeCH_2NR_2)_2$, where R = Et (**1**) and R = Me (**2**) as precursors. Thermogravimetric analyses proved them to be convenient compounds for the deposition of copper without any reducing agent. Depositions were carried out at substrate temperatures varied in the range 230 to 350 °C. The resulting films were highly crystalline according to their X-ray diffraction pattern and show a strong (111) preferred orientation,

which increases with increasing deposition temperature. Photoelectron spectroscopy (XPS) revealed, that copper films deposited at 230 and 260 °C solely consist of metallic copper, without any detectable carbon, nitrogen or oxygen contaminations. Copper films obtained from **1** at 260 °C had a resistivity of 2.16 µO-cm.